R = inside radius of the reservoir in inches.

(2) One row of holes shall be drilled lengthwise of the reservoir on a line intersecting the drain opening. When main reservoirs are drilled as described in paragraph (b)(1) of this section, the hydrostatic and hammer tests described in paragraph (a) of this section are not required during the annual inspection. Whenever any telltale hole shall have penetrated the interior of any reservoir, the reservoir shall be permanently withdrawn from service.

(c) *Welded main reservoirs without longitudinal lap seams.* For welded main reservoirs that do not have longitudinal lap seams, an appropriate NDE method that can measure the wall thickness of the reservoir may be used instead of the hammer test and hydrostatic test required in paragraph (a) of this section. The spacing of the sampling points for wall thickness shall not be greater than 12 inches longitudinally and circumferentially. The reservoir shall permanently be withdrawn from service where the NDE testing reveals wall thickness less than the value determined by the following formula:

t=(PR/(S − .6P)

Where:

t = Minimum value for wall thickness;
P = Certified working pressure in psi;
S = ⅕ of the minimum specified tensile strength of the material in psi, or 10,000 psi if the tensile strength is unknown; and
R = Inside radius of the reservoir in inches.

(d) *Welded or riveted longitudinal lap seam main reservoirs.* (1) For welded or riveted longitudinal lap seam main reservoirs, an appropriate NDE method that can measure wall thickness of the reservoir shall be used instead of, or in addition to, the hammer test and hydrostatic test. The spacing of the sampling points for wall thickness shall not be greater than 12 inches longitudinally and circumferentially. Particular care shall be taken to measure along the longitudinal seam on both plates at an interval of no more than 6 inches longitudinally. The reservoir shall be withdrawn permanently from service where NDE testing reveals wall thickness less than the value determined by the following formula:

t=(PR/(0.5S − 0.6P))

Where:

t = Minimum value for wall thickness;
P = Certified working pressure in psi;
S = ⅕ of the minimum specified tensile strength of the material in psi, or 10,000 psi if the tensile strength of steel is unknown; and
R = Inside radius of the reservoir in inches.

(2) Repairs of reservoirs with reduced wall thickness are prohibited.

§ 230.73 Air gauges.

(a) *Location.* Air gauges shall be so located that they may be conveniently read by the engineer from his or her usual position in the cab. No air gauge may be more than 3 psi in error.

(b) *Frequency of testing.* Air gauges shall be tested prior to reapplication following removal, as well as during the 92 service day inspection and whenever any irregularity is reported.

(c) *Method of testing.* Air gauges shall be tested using an accurate test gauge or dead weight tester designed for this purpose.

§ 230.74 Time of cleaning.

All valves in the air brake system, including related dirt collectors and filters, shall be cleaned and tested in accordance with accepted brake equipment manufacturer's specifications, or as often as conditions require to maintain them in a safe and suitable condition for service, but not less frequently than after 368 service days or during the second annual inspection, whichever occurs first.

§ 230.75 Stenciling dates of tests and cleaning.

The date of testing and cleaning and the initials of the shop or station at which the work is done, shall legibly be stenciled in a conspicuous place on the tested parts or placed on a card displayed under a transparent cover in the cab of the steam locomotive.

§ 230.76 Piston travel.

(a) *Minimum piston travel.* The minimum piston travel shall be sufficient to provide proper brake shoe clearance when the brakes are released.

(b) *Maximum piston travel.* The maximum piston travel when steam locomotive is standing shall be as follows: